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IN THE CLAIMS:

Please amend claims 1-3, 10, 20 and 50 as follows:

1. (Amended) A method of producing a semi-solid material without stirring, comprising:

heating a metal alloy to form a metallic melt;

regulating the transfer of an amount of the metallic melt into a temperature-controlled vessel; and

crystallizing the metallic melt in the vessel by cooling the metallic melt at a controlled rate less than 0.5 degrees Celsius per second to form a semi-solid material having a microstructure comprising rounded solid particles dispersed in a liquid metal matrix.

2. (Amended) A method of producing a semi-solid material without stirring, comprising:

heating a metal alloy to form a metallic melt;

regulating the transfer of an amount of the metallic melt into a temperature-controlled vessel; and

crystallizing the metallic melt in the vessel by cooling the metallic melt at a controlled rate within a range of about 0.01 degrees Celsius per second to about 5.0 degrees Celsius per second and without agitating the metallic melt to form a semi-solid material having a microstructure comprising rounded solid particles having a diameter no greater than about 50 μm dispersed in a liquid metal matrix.

3. (Amended) The method of claim 2, wherein the controlled rate of cooling of the metallic melt is within a range of about 0.01 degrees Celsius per second to about 0.5 degrees Celsius per second.

10. (Amended) A method of producing a semi-solid material without stirring, comprising:

heating a metal alloy to form a metallic melt;

transferring a portion of the metallic melt into a holding vessel;

controllably adjusting the temperature of the metallic melt in the holding vessel to a selected transfer temperature;

regulating the transfer of an amount of the metallic melt from the holding vessel into a temperature-controlled forming vessel; and

crystallizing the metallic melt in the forming vessel by cooling the metallic melt at a controlled rate to form a semi-solid material having a microstructure comprising rounded solid particles dispersed in a liquid metal matrix.

20. (Amended) The method of claim 1, wherein the rounded solid particles have a diameter in a range between about 40 μm and about 50 μm.

50. (Amended) A method of semi-solid forming a shaped article, comprising:

providing a metal alloy, a temperature-controlled vessel and a mold;

heating the metal alloy to form a metallic melt;

regulating the transfer of an amount of the metallic melt into the vessel; and

crystallizing the metallic melt in the vessel by cooling the metallic melt at a controlled rate less than 0.5 degrees Celsius per second to produce a semi-solid material having a microstructure comprising rounded solid particles dispersed in a liquid metal matrix;

feeding the semi-solid material from the vessel directly into the mold; and

forming the semi-solid material into a shaped article.

Please add the following new claims 66-84:

66. A method of producing a semi-solid material without stirring, comprising:

heating a metal alloy to form a metallic melt;

preheating a temperature-controlled vessel to a selected vessel temperature;

regulating the transfer of a select amount of the metallic melt into the vessel, the regulating comprising:

transferring the metallic melt into the vessel at a selected transfer temperature and at a selected transfer rate; and

controlling a differential between the temperature of the metallic melt during the heating and the temperature of the metallic melt during the transferring; and

crystallizing the metallic melt in the vessel by cooling the metallic melt at a controlled

rate to form a semi-solid material having a microstructure comprising rounded solid particles dispersed in a liquid metal matrix.

67. The method of claim 66, wherein the select amount of the metallic melt transferred in the vessel is between about 0.50 pounds and about 10 pounds.

68. The method of claim 66, wherein the selected transfer temperature is between the coherency temperature of the metal alloy and about 25 degrees Celsius above the liquidus temperature of the metal alloy; and

wherein the selected transfer rate is between about 0.01 pounds per second and about 1.0 pounds per second.

69. The method of claim 66, wherein the regulating further comprises controlling a drop in temperature of the metallic melt during the transferring.

70. The method of claim 66, wherein the selected vessel temperature is approximately equal to the temperature of the metallic melt.

71. The method of claim 66, further comprising:

holding the metallic melt in an intermediate vessel prior to the transferring; and

controllably adjusting the temperature of the metallic melt in the intermediate vessel to

the selected transfer temperature.

72. The method of claim 66, wherein the controlled rate of cooling of the metallic melt is no greater than about 1.0 degree Celsius per second.

73. The method of claim 72, wherein rounded solid particles have a diameter no greater than about 50 μm.

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74. The method of claim 72, wherein the controlled rate of cooling of the metallic melt is less than 0.5 degrees Celsius per second.

75. The method of claim 72, wherein the crystallizing occurs without agitating the metallic melt.

76. The method of claim 1, wherein the vessel includes a plurality of heat transfer zones; and

wherein the cooling of the metallic melt at the controlled rate comprises independently controlling the temperature of the metallic melt disposed adjacent each of the heat transfer zones.

77. The method of claim 50, wherein the controlled rate of cooling of the metallic

melt less than 0.5 degrees Celsius per second.

78. The method of claim 77, wherein the controlled rate of cooling of the metallic melt is within a range of about 0.01 degrees Celsius per second to about 0.5 degrees Celsius per second.

79. The method of claim 50, wherein the rounded solid particles have a diameter in a range between about 40 μm and about 50 μm.

80. The method of claim 50, wherein the regulating includes transferring the metallic melt into the vessel at a selected vessel temperature that is approximately equal to the temperature of the metallic melt.

81. The method of claim 50, wherein the regulating includes:

transferring the metallic melt into the vessel at a selected transfer temperature and at a selected transfer rate; and

controlling a differential between the temperature of the metallic melt during the heating and the temperature of the metallic melt during the transferring.

82. The method of claim 81, wherein the selected transfer temperature is between the coherency temperature of the metal alloy and about 25 degrees Celsius above the liquidus

temperature of the metal alloy; and

wherein the selected transfer rate is between about 0.01 pounds per second and about 1.0 pounds per second.

83. The method of claim 50, further comprising:

holding the metallic melt in an intermediate vessel prior to the transferring; and

controllably adjusting the temperature of the metallic melt in the intermediate vessel prior to the transferring.

84. The method of claim 50, wherein the vessel includes a plurality of heat transfer zones; and

wherein the cooling of the metallic melt at the controlled rate comprises independently controlling the temperature of the metallic melt disposed adjacent each of the heat transfer zones.

REMARKS

Claims 1-26 and 50-57 were pending for the non-final Office Action dated March 13, 2002. Each of the claims stands rejected under various grounds. The Office Action and the cited references have been carefully considered. In light of the amendments presented above and the following remarks, reconsideration and allowance of the subject application are hereby requested.